

Citation for published version:

Aquino, A, Haddock, G, Maio, G, Wolf, LJ & Alparone, FR 2016, 'The role of affective and cognitive individual differences in social perception', *Personality and Social Psychology Bulletin*, vol. 42, no. 6, pp. 798-810.
<https://doi.org/10.1177/0146167216643936>

DOI:

[10.1177/0146167216643936](https://doi.org/10.1177/0146167216643936)

Publication date:

2016

Document Version

Peer reviewed version

[Link to publication](#)

Aquino, A, Haddock, G, Maio, G, Wolf, LJ & Alparone, FR 2016, 'The role of affective and cognitive individual differences in social perception' *Personality and Social Psychology Bulletin*, vol 42, no. 6, pp. 798-810.

Copyright © 2016 (Society for Personality and Social Psychology, Inc). Reprinted by permission of SAGE Publications.

University of Bath

Alternative formats

If you require this document in an alternative format, please contact:
openaccess@bath.ac.uk

General rights

Copyright and moral rights for the publications made accessible in the public portal are retained by the authors and/or other copyright owners and it is a condition of accessing publications that users recognise and abide by the legal requirements associated with these rights.

Take down policy

If you believe that this document breaches copyright please contact us providing details, and we will remove access to the work immediately and investigate your claim.

The Role of Affective and Cognitive Individual Differences in Social Perception

Antonio Aquino

Chieti-Pescara University

Geoffrey Haddock, Gregory R. Maio, and Lukas J. Wolf

Cardiff University

Francesca Romana Alparone

Chieti-Pescara University

Word count (including abstract, text, references, footnotes): 9771.

Author Note: Correspondence concerning this paper should be addressed to Antonio Aquino, Chieti-Pescara University, via del Vestini 31, 66100 Chieti (Italy). Phone (+39) 349-0714111. Email: antonio.aquino@unich.it

Abstract

Three studies explored the connection between social perception processes and individual differences in the use of affective and cognitive information in relation to attitudes. Study 1 revealed that individuals high in need for affect (NFA; Maio & Esses, 2001) accentuated differences in evaluations of warm and cold traits, whereas individuals high in need for cognition (NFC; Cacioppo & Petty, 1982) accentuated differences in evaluations of competent and incompetent traits. Study 2 revealed that individual differences in NFA predicted liking of warm or cold targets, whereas individual differences in NFC predicted perceptions of competent or incompetent targets. Further, the effects of NFA and NFC were independent of structural bases and meta-bases of attitudes. Study 3 revealed that differences in the evaluation of warm and cold traits mediated the effects of NFA and NFC on liking of targets. The implications for social perception processes and for individual differences in affect-cognition are discussed.

Keywords: Affect, Cognition, Individual differences, Social perception

The Role of Affective and Cognitive Individual Differences in Social Perception

Why do I like that person so much? We spend abundant time and energy developing and maintaining positive relationships with others, but might often wonder *why* we like or dislike someone. The bases for our evaluations may be difficult to decipher, and two people might like (or dislike) the same individual for very different reasons. While social and personality psychologists have offered numerous insights toward understanding the factors that influence how we come to like and dislike others, here we explore a novel perspective. Specifically, we examine the connection between social perception processes and individual differences in the degree to which people utilize affective and cognitive information in relation to their attitudes.

Warmth and Competence in Social Perception

Every day, we meet new people and quickly form an impression about them on the basis of information concerning their traits and behaviors. Extensive research has shown that most of this information can be conceptualized in terms of two global dimensions, variously labeled as *warmth* and *competence*, *communion* and *agency*, or *nurturance* and *dominance* (for reviews, see Abele & Wojciszke, 2007; Cuddy, Fiske, & Glick, 2008; Fiske, Cuddy, & Glick, 2007; Wojciszke, 2005). According to a functional interpretation of these classes of information (Abele & Wojciszke, 2007; Fiske et al., 2007), when individuals meet a new person they want to know the other's intentions – that is, whether the target represents an opportunity or a threat (*warmth* dimension) – and whether they possess the ability to carry out those aims (*competence* dimension). The warmth/competence distinction plays an overarching role in different fields, including social perception (Wojciszke, Bazinska, & Jaworski, 1998), social value orientations (Peeters, 2002), construal of others' behaviors (Wojciszke, 1994), political psychology (Wojciszke & Klusek, 1996), and leadership (Chemers, 1997).

Diverse lines of work have considered how individuals weigh the warmth and competence dimensions. For example, research has found a compensation effect between the two dimensions

when two targets are compared (Judd, James-Hawkins, Yzerbyt, & Kashima, 2005; Kervyn, Yzerbyt, & Judd, 2010). That is, when one target is judged more positively on one dimension, the second target is judged more positively on the other dimension. Also, warmth judgments have been found to be elaborated upon more quickly than competence judgments and have been observed to have a greater impact on evaluations of others (Wojciszke & Abele, 2008). In some circumstances, however, perceptions of competence can be more important than perceptions of warmth (Cuddy, Glick, & Beninger, 2011). For example, competence can have a stronger effect when people evaluate themselves and closely related others compared to when they evaluate strangers (Abele & Wojciszke, 2007). The relative use of warmth and competence depends also on cultural orientation: a collectivist orientation emphasizes the warmth dimension, whereas an individualist orientation emphasizes the competence dimension (Wojciszke, 1997).

A New Perspective: Integrating Attitudinal Motivations and Social Perception

The lines of work described above imply that the relative importance of the warmth and competence dimensions can differ as a function of context. We believe that the relative importance of warmth and competence in evaluations should also depend on individual differences in the *motivation* to use affective and cognitive information in evaluations. Researchers examining attitude content have long speculated that attitudes can be based on affective and/or cognitive information (e.g., Cacioppo, Petty, & Geen, 1989; Rosenberg & Hovland, 1960; Zanna & Rempel, 1988; see Maio & Haddock, 2015). Affective information refers to feelings that individuals associate with an attitude object, whereas cognitive information refers to beliefs that individuals associate with an attitude object. Although affect and cognition share a “synergistic relation” (Eagly & Chaiken, 1993, p.201), they are not redundant (Crites, Fabrigar, & Petty, 1994; Esses & Maio, 2002; Haddock & Zanna, 1999).

Research has also demonstrated that individuals differ in the degree to which their evaluations are guided by affective and cognitive information (see Maio & Haddock, 2015).

Through the years, these affect-cognition differences have been operationalized in different ways. Of primary relevance to this paper is the *motivational* perspective. Research adopting this perspective considers the extent to which people are differentially motivated to seek out and use affective and cognitive information. These motivations are tapped by measures assessing individual differences in the need for affect (NFA; Maio & Esses, 2001) and the need for cognition (NFC; Cacioppo & Petty, 1982). NFA considers individual differences in the degree to which people approach or avoid situations that are emotion inducing (Maio & Esses, 2001). People high in NFA are motivated to understand both their own and others' emotions and they tend to use emotional information in attitude formation and in the regulation of behavior (Huskinson & Haddock, 2004). For instance, compared to people low in NFA, people high in NFA are more likely to view emotional movies and become involved in emotion-inducing events (Maio & Esses, 2001). NFC considers individual differences in the tendency to engage in and enjoy complex activities requiring cognitive effort. People high in NFC are more likely to seek out information about an object's attributes before evaluating it (Haugtvedt, Petty & Cacioppo, 1992). Relevant to this paper, research has demonstrated that NFA and NFC predict outcomes related to attitude formation and attitude change. For instance, Haddock, Maio, Arnold, and Huskinson (2008) found that higher levels of NFA predicted greater persuasion in response to an affect-based (but not cognition-based) message, whereas higher levels of NFC predicted greater persuasion in response to a cognition-based (but not affect-based) message.

Several novel hypotheses can be formed through integrating research on warmth-competence in social perception with research on individual differences in the motivation to seek out and use affective and cognitive information. On the one hand, people who are particularly motivated to seek out affective information (i.e., people high in NFA) should be more influenced by perceptions of a target person on the warmth dimension, which inherently reflects the target's capacity to elicit feelings (i.e., agreeableness versus disagreeableness). On the other hand, people

who are particularly motivated to seek out cognitive information (i.e., people high in NFC) should be more influenced by perceptions of a target person on the competence dimension, which inherently reflects the target's cognitive capabilities (i.e., aptitude versus ineptitude). In particular, people who are higher in NFA should distinguish the valence of warm and cold traits more strongly than people who are lower in NFA, whereas people who are higher in NFC should distinguish the valence of competent and incompetent traits more than people who are lower in NFC.

Consequently, people high in NFA should judge other people in a way that is more strongly influenced by differences between the positive and negative poles of the warmth dimension (i.e., they should accentuate differences in liking between people described as warm versus cold). In comparison, people high in NFC should judge other people in a way that is more strongly influenced by differences between the positive and negative poles of the competence dimension (i.e., they should accentuate differences in liking between people described as competent versus incompetent).

Indeed, existing strands of research provide tentative support for this perspective. For example, people higher in the need for emotional support have been shown to express a preference for interacting with a warm person over a cold person, whereas people lower in this need showed no preference (Hill, 1991). This finding suggests that higher warmth is perceived as more emotionally stimulating than lower warmth and that individual differences in motivation can be sensitive to differences in warmth. Moreover, the experience of competence has long been postulated as a reason for individuals to be high in NFC (Cacioppo, Petty, Feinstein, & Jarvis, 1996), and recent evidence indicates that managers high in NFC are more likely to show more competent decision-making (Carnevale, Inbar, & Lerner, 2011). This literature is in line with the notion that individual differences in NFC and competence are linked.

We conducted three studies testing our predictions. Study 1 tested whether individual differences in NFA and NFC predict the degree of differentiation in evaluations of traits on opposite

ends of each dimension (i.e., warm versus cold, competent versus incompetent). Building upon the findings, Study 2 tested whether individual differences in NFA and NFC predict the effects of information about a target's warmth or competence on attitudes toward the target, and whether these effects occur independently of other conceptualizations of affect- and cognition-based attitudes described later in this article (i.e., structural and meta-bases). Study 3 combined the approaches of the first two studies, testing whether the effects of NFA and NFC on evaluations of targets differing in warmth and competence are mediated by different evaluations of warmth- and competence-relevant traits.

STUDY 1

In the social perception literature, many studies have examined the valence of trait ratings (see Abele, Uchrowski, Suitner, & Wojciszke, 2008; Alicke, 1985; Anderson, 1968). Of particular relevance, Anderson (1968) asked participants to think of a person as being described by each trait and to rate the trait according to how much they would like the person. The results showed that the major component of the likableness ratings were between-participants differences, supporting the idea of individual differences in perceptions of traits.

Study 1 investigated the degree to which NFA and NFC impact evaluations of warmth- and competence-related traits. We tested whether individuals high in NFA are especially likely to distinguish valence among warm-cold attributes, whereas individuals high in NFC are especially likely to distinguish valence among competent-incompetent attributes. We expected that high NFA individuals would evaluate warm traits as extremely positive and cold traits as extremely negative, accentuating the differences on this dimension. Similarly, we expected that high NFC individuals would evaluate competent traits as extremely positive and incompetent traits as extremely negative, accentuating the differences on this dimension.

Method

Participants. Sixty students (52 females; $M_{\text{age}}=21.06$ years, $SD=3.28$) completed an online questionnaire in exchange for £3. This sample size was sought in order to have a sufficient ratio of participants to predictor variables in regression analyses.

Overview. The study was conducted using Qualtrics. Participants were informed that the study involved expressing their views about personality traits. Participants completed the NFA and NFC scales. In addition, they rated and ranked personality traits on the basis of their perceived valence. The order of presentation of the individual differences variables and the rating and ranking tasks was counterbalanced. Finally, participants were debriefed.

NFA and NFC. Participants' NFA was assessed with the short version of the NFA Scale (Appel, Gnambs, & Maio, 2012). This scale comprises 10 items: five items measure the motivation to approach emotions (e.g., "Emotions help people to get along in life, $\alpha=.83$), and five assess the motivation to avoid emotions (e.g., "I do not know how to handle my emotions, so I avoid them", $\alpha=.81$). Participants responded to these statements on a seven-point scale from 'totally disagree' to 'totally agree'. As the two dimensions were significantly correlated, $r(60)=-.43$, $p<.001$, a single NFA score was calculated by reverse scoring the avoidance items ($\alpha=.84$ for the single scale).

Participants' NFC was assessed using Cacioppo, Petty and Kao's (1984) 18-item measure. Participants rated the extent to which they agreed with items such as "I really enjoy a task that involves coming up with new solutions to problems" and "Thinking is not my idea of fun" (reverse scored). Participants responded to these statements on a five-point scale from 'extremely uncharacteristic of me' to 'extremely characteristic of me'. A single score for NFC was calculated by reverse scoring the negatively keyed items ($\alpha=.90$).

Interpersonal trait evaluations. Participants' perceptions of the valence of interpersonal traits were measured in two ways. In one task, participants rated the extent to which each of 40 traits was negative or positive using a seven-point scale from 'very negative' to 'very positive'.

There were 10 warmth-related traits (e.g., sociable; $\alpha=.66$), 10 cold-related traits (e.g., cold, $\alpha=.78$), 10 competence-related traits (e.g., intelligent, $\alpha=.73$), and 10 incompetence-related traits (e.g., unintelligent, $\alpha=.79$). The traits were selected from research by Tausch, Kenworthy, and Hewstone (2007) and were integrated with traits from the circumplex Revised Interpersonal Adjective Scales (Trapnell & Wiggins, 1990).

In the other task, participants ranked 20 traits on the basis of their valence. The traits included five warmth-related traits, five cold-related traits, five competence-related traits, and five incompetence-related traits. The traits used in this task were selected to be representative of those used in the rating task, while the smaller number enabled participants to rank the traits with greater ease.

Results

Prediction of rating data

Correlations. NFA and NFC were not correlated, $r(60)=-.06$, $p=.64$. Regarding the average valence ratings of the attributes, participants who rated the warm traits more positively also rated the cold traits more negatively, $r(60)=-.49$, $p<.001$. Similarly, participants who rated the competent traits more positively also rated the incompetent traits more negatively, $r(60)=-.69$, $p<.001$.

Table 1 shows correlations among NFA, NFC, and the average valence ratings of the warm, cold, competent, and incompetent attributes. NFA scores were positively correlated with ratings of warm traits, $r(60)=.42$, $p<.001$, and negatively correlated with ratings of cold traits, $r(60)=-.30$, $p=.02$. These correlations are consistent with our hypotheses. Interestingly, NFA scores were positively associated with evaluations of incompetent traits, $r(60)=.30$, $p=.02$. NFA scores were not related to the valence ratings of the competent traits, $r(60)=-.20$, $p=.12$.

A complementary pattern of effects was found regarding the correlations between NFC scores and attribute evaluations. As predicted, NFC scores were positively correlated with ratings

of competent traits, $r(60)=.63$, $p<.001$, and negatively correlated with ratings of incompetent traits, $r(60)=-.46$, $p<.001$. NFC scores were not related to the ratings of warm, $r(60)=.11$, $p=.38$, or cold traits, $r(60)=.10$, $p=.45$.

Regression analyses. Next, we conducted regression analyses with NFA and NFC scores as predictors and the average valence ratings of the warm, cold, competent, and incompetent attributes as outcome variables. Regarding warm traits, only NFA scores predicted participants' evaluations, $\beta=.43$, $t(57)=3.58$, $p=.001$, 95% CI [.19,.67], such that higher NFA scores were associated with more positive evaluations of the warm traits. Similarly, only NFA scores predicted participants' evaluations of the cold traits, $\beta=-.29$, $t(57)=-2.31$, $p=.025$, 95% CI [-.54,-.04], such that higher NFA scores were associated with more negative evaluations of the cold traits.

Analyses of the competence-incompetence dimension revealed a complementary pattern of results. Regarding competent traits, only NFC scores predicted participants' evaluations, $\beta=.62$, $t(57)=6.24$, $p<.001$, 95% CI [.43,.83], such that higher NFC scores were associated with more positive evaluations of competent traits. Similarly, NFC scores predicted participants' evaluations of incompetent traits, $\beta=-.44$, $t(57)=-3.95$, $p<.001$, 95% CI [-.66,-.22], such that higher NFC scores were associated with more negative evaluations of incompetent traits. Interestingly, this latter analysis revealed an effect of NFA, $\beta=.27$, $t(57)=2.39$, $p=.02$, 95% CI [.04, .50], such that higher NFA scores were associated with more *positive* evaluations of the incompetent traits. Thus, while high NFC individuals expressed a more negative evaluation of the incompetent traits, high NFA individuals expressed a more positive evaluation of the same traits. We return to this second finding later in the article.

Prediction of ranking measures

Correlations. To test whether NFA and NFC predicted the ranks assigned to warmth and competence dimensions, we first reversed the rank assigned to each trait (such that a higher score represented greater positivity of the trait), and then computed a median score for each of the four

types of traits. Table 2 shows the correlations among NFA, NFC, the difference between the median rank of warm and cold traits, and the difference between the median rank of competent and incompetent traits. Consistent with our predictions, there was a positive correlation between NFA scores and more favorable rankings for warm versus cold attributes, $r(60) = .57, p < .001$. Put differently, participants high in NFA ranked warm traits more highly above cold traits than participants low in NFA. Correspondingly, there was a positive correlation between NFC scores and more favorable rankings for competent versus incompetent attributes, $r(60) = .41, p = .001$. Put differently, participants high in NFC ranked competence traits more highly above incompetent traits than participants low in NFC.

Regression analyses. Next, we entered the difference between the median scores of warm and cold traits, as well the difference between the median scores of competent and incompetent traits, as outcome variables in separate regression analyses, with NFA and NFC scores as predictor variables. Consistent with our hypotheses, individual differences in NFA scores positively predicted the difference between rankings of the warm and the cold traits, $\beta = .54, t(57) = 5.95, p < .001, 95\% \text{ CI } [.36, .72]$, whereas individual differences in NFC scores negatively predicted the difference between rankings of the warm and the cold traits, $\beta = -.44, t(57) = -4.86, p < .001, 95\% \text{ CI } [-.64, -.26]$. On the competent-incompetent dimension, individual differences in NFC positively predicted the difference between rankings of the competent and the incompetent traits, $\beta = .41, t(57) = 3.61, p = .001, 95\% \text{ CI } [.18, .62]$, whereas individual differences in NFA negatively predicted the difference between rankings of the competent and the incompetent traits, $\beta = -.31, t(57) = 2.73, p = .001, 95\% \text{ CI } [-.54, -.08]$.

Discussion

The aim of this study was to consider the degree to which NFA and NFC are associated with how individuals evaluate warmth and competence attributes. We expected that individual differences in NFA would be associated with accentuated differences on the warm-cold dimension,

whereas individual differences in NFC would be associated with accentuated differences on the competent-incompetent dimension. Consistent with this reasoning, individuals high in NFA accentuated the difference in valence between warm and cold traits, whereas individuals high in NFC accentuated the difference in valence between competent and incompetent traits. Together, these results supported our hypotheses about the role of individual differences in affective and cognitive motivation in the evaluation of information about warmth and competence traits.

STUDY 2

Study 1 was important in demonstrating the associations between individual differences in NFA and NFC and the evaluation of attributes. Of course, it is important to address the impact of these effects on *evaluations of individuals* described by warmth or competence attributes. In Study 2, we presented participants with descriptions of four fictitious targets who were described as warm, cold, competent, or incompetent. We tested whether individual differences in NFA and NFC predicted liking of these individuals.

Further, we tested whether any effects of NFA and NFC would occur independently of two other approaches used to assess individual differences in the degree to which attitudes are guided by affective and cognitive information – the structural and meta-bases perspectives. Research assessing the *structural bases* of attitudes has conceptualized attitude bases in terms of differences in the consistency among individuals' attitudes, feelings, and beliefs about attitude objects (e.g., Crites et al., 1994; Huskinson & Haddock, 2004; See, Petty, & Fabrigar, 2008, 2013). According to this perspective, people have affect-based attitudes when their overall attitudes are correlated more strongly with the favorability of their affective responses than with the favorability of their beliefs, across multiple attitude objects. Conversely, people have cognition-based attitudes when their overall attitudes are correlated more strongly with the favorability of their beliefs than with the favorability of their feelings, across multiple attitude objects. Knowing whether an individual's attitudes have an affective or cognitive structural basis has important implications. For example,

people are more influenced by cogent persuasive messages that correspond to the structural basis of their attitudes (Huskinson & Haddock, 2004; see Edwards, 1990; Fabrigar & Petty, 1999 for comparable effects using experimentally induced affective or cognitive attitudes). Further, structural bases capture variation in the efficiency of processing affective versus cognitive information (See et al., 2013).

Recently, research has focused on meta-cognitive perceptions of attitudinal bases. Within this *meta-bases* approach, participants are asked directly whether they perceive their attitudes to be more in line with their feelings or beliefs about attitude objects (See et al., 2008, 2013); their responses to such questions are used to determine the extent to which they perceive themselves as relying on affect or cognition in their attitudes. As with the motivational and structural bases approaches, the meta-bases perspective predicts attitude-relevant outcomes. For instance, See et al. (2013) found that meta-bases capture variation in the selective interest for affective versus cognitive information.

Study 2 addressed whether individual differences in NFA and NFC are linked with the effects of information about a target's warmth or competence on target evaluations. We expected that people high in NFA would be more likely to be influenced by warmth-related traits, such that individual differences in NFA would be positively associated with evaluations of a person described as warm and negatively associated with evaluations of a person described as cold. In contrast, we expected that people high in NFC would be more likely to be influenced by competence-related traits, such that individual differences in NFC would be positively associated with evaluations of a person described as competent and negatively associated with evaluations of a person described as incompetent. Furthermore, we explored whether NFA and NFC predict interpersonal evaluation independently from structural and meta-bases.

Method

Participants. One hundred and eleven students (97 females; $M_{\text{age}}=20.06$ years, $SD=3.28$) completed an online questionnaire in exchange for course credit. This sample size was sought in order to have a sufficient ratio of participants to predictor variables in regression analyses.

Procedure. The study was conducted using Qualtrics. Participants took part in a 2 (*Trait description*: competence versus warmth) x 2 (*Valence*: positive versus negative) within-participant design. The variables were manipulated by giving participants information describing four fictitious people: Carol, Lisa, Amber, and Samantha. Carol was described with warm traits, Lisa with cold traits, Amber with competence traits, and Samantha with incompetence traits (see Appendix). The order in which the four descriptions were presented was counterbalanced. Participants rated each target and ranked them on the basis of their preference. Finally, participants completed measures of NFA, NFC, structural bases, and meta-bases.¹

Predictors.

NFA and NFC. Participants' NFA ($\alpha=.85$) and NFC ($\alpha=.85$) were assessed in the same way as in Study 1.

Structural attitude bases. We assessed participants' structural attitude bases via a procedure used successfully in many previous studies (e.g., Crites et al., 1994, Huskinson & Haddock, 2004, See et al., 2008; 2013). The technique requires that participants complete affective, cognitive, and attitudinal items for a number of attitude objects. The affective items ask participants to indicate the feelings that they have towards each object, using eight semantic differential scales (e.g., annoyed–happy). The cognitive items ask participants to indicate the beliefs they have about the objects, using seven semantic differential scales (e.g., useless– useful). The attitudinal items use four semantic differentials (e.g., negative–positive) to assess overall evaluations of the objects. This study used five attitude objects: abortion, birth control, the death penalty, exercising, and spiders (presented in that order).² After reporting their affective, cognitive, and attitudinal responses as well

as meta-bases (see below) for one attitude object, participants repeated the procedure for each of the remaining attitude objects.

A structural bases index was created by first computing two within-participant correlations for each participant. One correlation reflected the relation between the favorability of the participant's affect and attitude scores across the five attitude objects. The other measured the relation between the favorability of the participant's cognition and attitude scores across the five attitude objects. Next, these correlations were converted to Fisher's z values. Finally, consistent with previous research (Huskinson & Haddock, 2004; See et al., 2008, 2013), a participant's cognition–attitude correlation was subtracted from their affect–attitude correlation, such that higher scores indicated higher dominance of affect over cognition in the participant's attitude structure across attitude objects.

Meta-bases. After reporting their structural bases for an attitude object, participants indicated their meta-bases by answering two questions: (a) “To what extent do you think your attitudes towards (insert attitude object) are driven by your emotions?” and (b) “To what extent do you think your attitudes towards (insert attitude object) are driven by your beliefs?” Following past research (See et al., 2008, 2013), a meta-bases index was computed by first averaging participants' responses to the belief question (across objects) and the emotion question (across objects). Next, standardized values for each participant's averaged responses to the belief question were subtracted from standardized values for the participant's averaged responses to the emotion question. Therefore, larger positive scores indicated more affective meta-bases, and larger negative scores indicated more cognitive meta-bases.

Dependent variables. Participants rated each target using four items (e.g., “In general, how bad or good a person do you think X might be?”; “How much do you think you would like X?”; see Bizer, Tormala, Rucker, & Petty, 2006). Each item was answered on a seven-point scale,

with a higher value representing a more positive attitude. Alpha coefficients across targets ranged from .84 to .89.

Participants also ranked each target on the basis of liking. These ranks were then converted, such that a higher score was associated with a more favorable evaluation of the target. Finally, participants indicated how much more they liked Carol compared to Lisa and Amber compared to Samantha. These comparisons enabled direct comparisons of the warm versus cold and competent versus incompetent targets.

Results

Correlations among predictor variables. Correlations among the predictor variables are presented in Table 3. The only significant correlation was between NFC and meta-bases, $r(111) = -.17, p = .06$, such that high NFC scores were associated with more cognitive meta-bases. Thus, consistent with other work (See et al., 2008, 2013), NFA, NFC, structural, and meta-bases were distinct.

Correlations among evaluations of targets. Participants who rated the warm target more positively also rated the cold target more negatively, $r(111) = -.35, p < .001$. Ratings of the competent target were not associated with ratings of the incompetent target, $r(111) = -.07, p = .44$.

Correlations among predictors and evaluations of targets. Correlations among the affect-cognition predictors and evaluations of the warm and cold targets are reported in the upper section of Table 4. Consistent with our hypothesis, higher NFA scores were associated with more positive evaluations of the warm target, $r(111) = .28, p = .002$, and with more negative evaluations of the cold target, $r(111) = -.23, p = .02$. Accordingly, NFA scores predicted the difference between evaluations of the warm and cold targets, $r(111) = .31, p = .001$. Similarly, participants high in NFA preferred the warm target to the cold target, $r(111) = .21, p = .03$.

Correlations among the affect-cognition predictors and evaluations of the competent and incompetent targets are reported in the lower section of Table 4. As expected, higher NFC scores

were associated with more positive evaluations of the competent target, $r(111)=.19, p=.05$, and with more negative evaluations of the incompetent target, $r(111)=-.20, p=.04$. Accordingly, NFC predicted the difference between evaluations of the competent and incompetent targets, $r(111)=.26, p=.005$. Similarly, participants high in NFC tended to prefer the competent target to the incompetent target.

Regression analyses of evaluations. Next, we conducted regression analyses where we entered NFA, NFC, structural bases, and meta-bases simultaneously as predictor variables. Separate analyses were conducted for each target. Starting with the warm and cold targets, only NFA predicted attitudes toward Carol (warm), $\beta=.30, t(105)=3.22, p=.002, 95\% \text{ CI } [.11,.49]$, and Lisa (cold), $\beta=-.23, t(105)=-2.37, p=.02, 95\% \text{ CI } [-.42,-.04]$. These analyses demonstrate that higher NFA scores were associated with a more positive evaluation of the warm target and a more negative evaluation of the cold target, even after controlling for the other affect-cognition variables.

Turning to the competent-incompetent dimension, only NFC scores predicted attitudes toward Amber (competent), $\beta=.21, t(105)=2.21, p=.03, 95\% \text{ CI } [.02,.40]$; and Samantha (incompetent), $\beta=-.21, t(105)=-2.12, p=.04, 95\% \text{ CI } [-.41,-.01]$. These analyses demonstrate that higher NFC scores were associated with a more positive evaluation of the competent target and a more negative evaluation of the incompetent target, even after controlling for the other affect-cognition variables.

Next, we examined how the affect-cognition variables predicted the difference in evaluations between (a) the warm and cold targets and (b) the competent and incompetent targets. As expected, only NFA predicted the difference on the warm-cold dimension, $\beta=.32, t(105)=3.40, p=.001, 95\% \text{ CI } [.13,.51]$, whereas only NFC predicted the difference on the competence-incompetence dimension, $\beta=.29, t(105)=3.01, p=.003, 95\% \text{ CI } [.10,.48]$. Put differently, participants high in NFA uniquely accentuated differences on the warm-cold dimension by expressing a more positive evaluation of a warm target and a more negative evaluation of a cold

target, whereas participants high in NFC uniquely accentuated differences on the competence-incompetence dimension by expressing a more positive evaluation of a competent target and a more negative evaluation of an incompetent target.

Consistent with this conclusion, additional analyses indicated that only NFA scores predicted responses to the question “How much more do you like Carol compared to Lisa?”, $\beta=.23$, $t(105)=2.43$, $p=.02$, 95% CI [.04,.42], such that high NFA scores predicted greater liking of the warm over the cold target. Further, only NFC scores predicted the answer to the question “How much more do you like Amber compared to Samantha?”, $\beta=.20$, $t(105)=2.06$, $p=.04$, 95% CI [.01,.39], such that high NFC scores predicted greater liking of the competent over the incompetent target.

Prediction of ranking measures. To test whether the affect-cognition variables predicted the ranks assigned to the targets, we calculated non-parametric correlations among the affect-cognition variables and the ranking of the four targets (see Table 5). Largely consistent with our hypothesis, NFA scores were positively correlated with the rank assigned to the warm target, $\rho(110)=.26$, $p=.006$, although not correlated with the rank assigned to the cold target, $\rho(110)=-.09$, $p=.37$. Further, NFC scores were positively correlated with the rank assigned to the competent target, $\rho(111)=.26$, $p=.005$, and negatively correlated with the rank assigned to the incompetent target, $\rho(110)=-.29$, $p=.002$.³

Discussion

Study 2 builds upon the findings of Study 1 by offering further evidence regarding the impact of NFA and NFC in the context of person perception. The results of Study 2 show that individual differences in NFA and NFC influence how people evaluate targets that differ in warmth and competence, building upon the finding in Study 1 that NFA and NFC influence the valence that individuals attach to warmth- and competence-related attributes. Specifically, NFA predicted participants' evaluations of warm and cold targets, whereas NFC predicted participants' evaluations

of competent-incompetent targets. These results suggest that individuals with high NFA relied more upon affective, warm/cold information in forming impressions, whereas individuals with high NFC relied more upon cognitive, competent/incompetent information. The finding that individual differences in NFA and NFC predict the effects of the warmth and competence information on attitudes fits past evidence showing the effects of NFA and NFC on persuasion from affective and cognitive information (Haddock et al., 2008).

Further, NFA and NFC predicted interpersonal evaluations independent of structural and meta-bases, providing additional evidence that these constructs are distinct and involve different processes (see also See et al., 2008, 2013). Before interpreting this pattern, however, it was important to test its replicability in a slightly altered design, as described below.

STUDY 3

Study 3 directly investigated the process presumed to account for the individual effects that emerged in the previous two studies. Specifically, we tested whether evaluations of warmth- and competence-related traits mediated the effects of NFA and NFC on target evaluations. We expected that valence differences in warm-cold traits would mediate the impact of NFA on liking of warm or cold targets, whereas valence differences in competent-incompetent traits would mediate the impact of NFC on liking of competent or incompetent targets.

Further, we explored whether NFA and NFC predict interpersonal evaluations through the mediation of trait evaluations, independently of structural and meta-bases. We assessed structural and meta-bases in a slightly different manner from Study 2, which measured these bases using diverse objects that should have significant affective and cognitive components. While these objects have been used reliably in past research (See et al., 2008), it is possible that they are less appropriate to the present context and its focus on *interpersonal* evaluations. To address this issue, the objects used to measure structural and meta-bases focused on individuals and groups.

Method

Participants. One hundred and ninety-seven individuals (108 males; $M_{\text{age}}=23.64$ years, $SD=5.90$) completed an online questionnaire in exchange for £3. This sample size was sought in order to have a sufficient ratio of participants to predictor variables in regression analyses.

Procedure. The study was conducted using Qualtrics. Participants were informed that the study involved expressing their views about personality traits. First, participants completed the NFA, NFC, structural, and meta-bases measures. Next, they read the four target descriptions used in Study 2 and rated each target. The order in which the four descriptions were presented was counterbalanced. Participants then rated 16 personality traits on the basis of their perceived positivity and negativity. Finally, participants were debriefed.

NFA, NFC, structural bases and meta-bases. Participants' NFA ($\alpha=.83$) and NFC ($\alpha=.90$) were assessed in the same way as the previous studies. As noted above, the structural and meta-bases measures used attitude objects reflecting individuals or groups (Tom Cruise, Britney Spears, Barack Obama, truck drivers, and scientists).

Interpersonal judgments. Attitudes toward the four targets were assessed in same way as in Study 2 (all $\alpha>.87$). For parsimony, participants were not asked how much they liked one target more than another.

Interpersonal trait evaluations. In this study, we used a set of 16 of the 40 traits from Study 1, selecting traits that loaded highly on the respective factor. The set included four warmth-related traits (e.g., sociable; $\alpha=.61$), four cold-related traits (e.g., cold, $\alpha=.59$), four competence-related traits (e.g., intelligent, $\alpha=.64$), and four incompetence-related traits (e.g., unintelligent, $\alpha=.58$). Participants rated the valence of each trait using a seven-point scale from 'very negative' to 'very positive'. Given the similarity in Study 2's results between the rating and ranking measures, we did not use the ranking task.

Results

Prediction of trait evaluations. Table 6 shows correlations among NFA, NFC, structural, and meta-bases and the average valence ratings of the warm, cold, competent, and incompetent attributes. On the warm-cold dimension, NFA scores were positively correlated with ratings of warm traits, $r(197)=.29, p<.001$, and negatively correlated with ratings of cold traits, $r(197)=-.20, p=.004$. On the competent-incompetent dimension, NFC scores were positively correlated with ratings of competent traits, $r(197)=.28, p<.001$, and negatively correlated with ratings of incompetent traits, $r(197)=-.26, p<.001$. These correlations replicate the findings of Study 1. Interestingly, NFA scores were positively related to competence ratings, $r(197)=.15, p=.04$ (see general discussion).

Next, we conducted regression analyses with NFA, NFC, structural, and meta-bases scores as predictors and the average valence ratings of the warm, cold, competent, and incompetent attributes as outcome variables. Regarding warm traits, only NFA predicted participants' evaluations, $\beta=.30, t(191)=4.26, p<.001, 95\% \text{ CI } [.16,.45]$, such that higher NFA scores were associated with more positive evaluations of the warm traits. Similarly, only NFA predicted participants' evaluations of the cold traits, $\beta=-.19, t(191)=-2.57, p=.01, 95\% \text{ CI } [-.33,-.04]$, such that higher NFA scores were associated with more negative evaluations of the cold traits. Both of these effects replicate Study 1. Regarding competent traits, only NFC predicted participants' evaluations, $\beta=.24, t(191)=3.44, p<.001, 95\% \text{ CI } [.10,.39]$, such that higher NFC scores were associated with more positive evaluations of competent traits. Similarly, only NFC predicted participants' evaluations of incompetent traits, $\beta=-.24, t(191)=-3.41, p<.001, 95\% \text{ CI } [-.39,-.10]$, such that higher NFC scores were associated with more negative evaluations of incompetent traits. Both of these effects replicate Study 1.

Prediction of target evaluations. Correlations among the affect-cognition predictors and evaluations of the warm and cold targets are reported in the upper section of Table 7. Consistent

with Study 2, higher NFA scores were associated with more positive evaluations of the warm target, $r(197)=.15$, $p=.03$, and more negative evaluations of the cold target, $r(197)=-.20$, $p=.004$.

Furthermore, NFA scores were positively associated with the difference between evaluations of the warm and cold targets, $r(197)=.22$, $p=.002$.

Correlations among the affect-cognition predictors and evaluations of the competent and incompetent targets are reported in the lower section of Table 7. As expected, only NFC scores were associated with more positive evaluations of the competent target, $r(197)=.35$, $p<.001$.

Evaluations of the incompetent target were not significantly associated with any predictor.

Consistent with Study 2, only NFC scores were associated with the difference between evaluations of the competent and incompetent targets, $r(197)=.28$, $p<.001$.

Next, we conducted regression analyses where we entered NFA, NFC, structural bases, and meta-bases simultaneously as predictor variables. Separate analyses were conducted for each target. Starting with the warm and cold targets, only NFA impacted attitudes toward Carol (warm), $\beta=.14$, $t(191)=1.88$, $p=.06$, 95% CI [-.01,.29]. Further, NFA predicted attitudes toward Lisa (cold), $\beta=-.23$, $t(191)=-3.22$, $p=.002$, 95% CI [-.37,-.09]. NFC also predicted attitudes toward Lisa, but in the opposite direction, $\beta=.18$, $t(191)=2.44$, $p=.02$, 95% CI [.03,.33]. Only NFA predicted the difference in attitudes toward Carol and Lisa, $\beta=.24$, $t(191)=3.27$, $p=.001$, 95% CI [.09;.39]. Together, these analyses demonstrate that higher NFA scores were associated with a more positive evaluation of the warm target and a more negative evaluation of the cold target, even after controlling for the other affect-cognition variables.

Turning to the competent-incompetent dimension, only NFC scores predicted attitudes toward Amber (competent), $\beta=.35$, $t(191)=4.97$, $p<.001$; 95% CI [.21,.49], as well as the difference in attitudes toward Amber and Samantha (incompetent), $\beta=.28$, $t(191)=3.96$, $p<.001$; 95% CI [.14,.42]. Attitudes toward Samantha were not predicted by any variable, though the effect of NFC was in the expected direction ($p=.149$). Together, these analyses demonstrate that higher NFC

scores were associated with a more positive evaluation of the competent target and the difference in liking between the competent and incompetent targets, even after controlling for the other affect-cognition variables.

Mediation analysis. We used Process (model 4, 1000 bootstraps; Hayes, 2013) to test for mediation. For parsimony, we used the relevant individual difference measure as the predictor, the difference in evaluation of relevant attributes as the mediator, and the difference in evaluation of the relevant targets as the outcome variable. Starting with the warm-cold dimension, the analyses above showed that NFA predicted the evaluations of warm and cold traits and the difference in attitudes toward the warm and cold targets. The mediation analysis showed that the difference in the valence ratings of warm and cold traits mediated the effect of NFA on the difference in attitudes toward Carol and Lisa ($IE=.30$; 95% $CI=.19,.46$). The direct effect of NFA on the outcome was not reliable ($DE=.10$, 95% $CI = -.11,.30$). This pattern implies that the effect of NFA on the difference in attitude toward the warm and the cold targets was mediated by the difference in the valence ratings of warm and cold traits.

Turning to the competence dimension, the analyses above showed that NFC predicted evaluations of competent and incompetent traits and the difference in attitudes toward the competent and incompetent targets. The mediation analysis showed that the difference in the valence ratings of the competent and incompetent traits mediated the effect of NFC on the difference in attitudes toward Amber and Samantha ($IE=.29$; 95% $CI=.18,.46$). The mediation was partial, as the direct effect of NFC on the outcome was still significant ($DE=.30$; 95% $CI=.02,.57$).⁴

Discussion

This study had two aims. First, we sought to replicate the primary effects found in Studies 1 and 2. Consistent with Study 1, NFA and NFC influenced valence judgments of warmth- and competence-relevant attributes. Consistent with Study 2, NFA and NFC influenced attitudes toward targets differing in warmth and competence. Further, these effects were independent of

structural and meta-bases, despite changing these measures to make them particularly relevant to interpersonal attitudes. Overall, then, the primary findings were replicated.

Second, Study 3 directly tested whether evaluations of warmth- and competence-related attributes mediated the effects of NFA and NFC on interpersonal judgments. Specifically, we expected that valence differences in perceptions of warmth-cold traits would mediate the impact of NFA on evaluations of warm-cold targets, whereas valence differences in perceptions of competent-incompetent traits would mediate the impact of NFC on evaluations of competent-incompetent targets. Consistent with this reasoning, the results confirmed that the effects of NFA and NFC on attitudes toward the targets were at least partly mediated by differences in evaluations of the warm-cold and competent-incompetent attributes.

General Discussion

The primary aim of this research was to integrate research on social perception and affective-cognitive attitude content, in order to explore whether the extent to which individuals consider and evaluate warmth-relevant and competence-relevant information is associated with affective-cognitive individual differences. In Study 1, where the outcome variable was individuals' perceptions of the valence of interpersonal traits, individual differences in NFA predicted the perceived valence of warmth-related traits, whereas individual differences in NFC predicted the perceived valence of competence-related traits. In Study 2, where the outcome consisted of evaluations of targets who differed in their attributes, only individual differences in NFA predicted liking of targets who were warm or cold, whereas only individual differences in NFC predicted perceptions of targets who were competent or incompetent. Further, the effects of NFA and NFC were independent of structural bases and meta-bases of attitudes, neither of which predicted target evaluations. Study 3 largely replicated the effects of Studies 1 and 2, while also finding that evaluations of warmth- and competence-related traits mediated the effect of NFA and NFC on interpersonal judgments. Specifically, the difference in valence ratings between warm and cold

traits fully mediated the effect of NFA on warmth-related attitudes, whereas the difference in valence ratings between competent and incompetent traits partially mediated the effect of NFC on competence-related attitudes.

Together, these findings extend our knowledge about both social perception and attitudes. From the social perception perspective, the results highlight that evaluations of individuals based on warmth and competence information are related to individual differences in motives related to seeking out affective and cognitive information. Thus, the findings build upon prior research demonstrating the importance of contextual factors in person perception (e.g., Cuddy et al., 2011) by showing that attitudinal individual differences impact the effects of warmth and competence information. This means, for example, that a warm person is not necessarily judged more favorably than a competent person, but that the evaluation varies as a function of individual differences in affective and cognitive preferences.

From an attitudinal perspective, the current findings demonstrate a novel outcome that is predicted by NFA and NFC. Thus, these findings add new insights regarding the role of motivational perspectives in the psychology of attitudes. Further, NFA and NFC predicted not only perceptions of single targets, but also differences in evaluations of the positive and negative descriptions for the correspondent dimension (i.e., warm versus cold and competent versus incompetent). This is an innovation compared to classical studies on structural correspondence, where the focus was on the difference between the affective and cognitive dimension and not within the positive and negative pole of the same dimension (e.g., warm versus cold).

It is worth noting that when evaluating the favorability of attributes, NFA showed two divergent effects with respect to the evaluation of competence-relevant traits. In Study 1, NFA was positively correlated with evaluations of incompetent traits, while in Study 3 NFA was positively correlated with evaluations of competent traits. As these effects were divergent and not replicated, we are reluctant to speculate about their reliability.

In Studies 2 and 3, the effects of NFA and NFC were independent of structural bases and meta-bases of attitude. This independence fits longstanding distinctions between attitude function (i.e., motivations served by attitudes) and attitude content (Maio & Olson, 2000). NFA and NFC are salient motivations that influence the weighting of affective and cognitive information within each attitude component and its impact on attitude formation and attitude change. In contrast, structural bases and meta-bases tap efficiency and self-perceptions regarding the attention devoted to using these sources. Along these lines, measures of NFA, NFC, structural bases, and meta-bases are quantifiably independent of each other (see also See et al., 2008). Thus, our data support the conclusion that individual differences in affective-cognitive motivation are particularly relevant to understanding how people weigh warmth and competence information in social perception, over and above the efficiency and self-perception processes tapped by the structural and meta-bases. Furthermore, this conclusion was supported with both the original approach to measuring the structural and meta-bases and a novel approach that tailored the measures to the interpersonal context.

Nevertheless, we would not go so far as to argue that the structural and meta-bases possess no connection to the use of warmth and competence traits in social perception. In operationalizing the structural and meta-bases perspectives, we followed past research and used single indices that combined the affective and cognitive components (e.g., See et al., 2008; 2013). It is interesting to consider the effects of separating these components. We therefore ran supplementary analyses in which we used two scores for both of the structural and meta-bases perspectives; one focusing on affect, the second focusing on cognition. The regression of these six predictors on outcomes in Study 2 and Study 3 are reported in the Supplementary Analyses (online). The supplementary analyses showed that NFA and NFC largely continued to predict warmth-related and competence-related outcomes, even when the regression model included separate cognitive and affective indices for structural and meta-bases. The measures of the structural bases sometimes became stronger

predictors in this separated approach, but some of their effects were not in the theoretically congruent direction (e.g., the link between affective structural bases and ratings of the competent target in Study 2, the link between cognitive structural bases and evaluations of warm versus cold targets in Study 3). Moving forward, the results of these supplementary analyses suggest that the separation of the affective and cognitive dimensions of the structural bases may influence their predictive ability. Thus, the utility of different approaches for quantifying structural and meta-bases is a potentially important topic for future investigation, even though these new approaches do not alter the conclusions drawn here about the roles of NFA and NFC.

Future research

The present findings raise additional questions for future research. For example, individuals' own perceptions of their central traits might differ as a function of individual differences in NFA and NFC - individuals high in NFA might perceive warm traits as particularly central to themselves, whereas individuals high in NFC might perceive competence traits as particularly central to themselves. Second, building upon work by Wojciszke and colleagues (e.g., Wojciszke & Abele, 2008; Wojciszke et al., 1998), the speed of judgments related to warmth and competence might differ as a function of individual differences in NFA and NFC. These effects would presumably arise as a consequence of individual differences in the extent to which affective and cognitive information is central to the self – information that is more central should be used more in self-description and be utilized more quickly in judging others.

Another interesting consideration for future research is to extend the present results to the intergroup context. Warmth and competence emerge as fundamental dimensions in people's judgments of social groups (Cuddy et al., 2008, 2009; Fiske, Cuddy, & Glick, 2002). The Stereotype Content Model (Cuddy et al., 2008; Fiske, Glick, & Xu, 2002) has demonstrated that many social groups are stereotyped ambivalently – as competent but cold or as warm but incompetent. These patterns elicit different sets of emotions and behaviors toward the members of

different groups (e.g., respect and disliking for a group perceived as competent but cold). It would be interesting to explore in greater detail the role of individual differences in NFA and NFC in this process.

Conclusion

In sum, the present studies integrated two areas of social psychological research – social perception and individual differences in the use of affect and cognition in evaluative processes. The findings revealed that individual differences in the motivation to seek out affect and cognition play an important role in evaluations of warmth and competence traits and hence should be taken into consideration when modelling use of these traits in social perception. Put simply, people react differently to warmth and competence traits, and individual differences in the motivation to seek out affect and cognition help to understand these differences.

References

- Abele, A.E., Uchrowski, M., Suitner, C., & Wojciszke, B. (2008). Toward an operationalization of the fundamental dimensions of agency and communion: Trait content ratings in five countries considering valence and frequency of word occurrence. *European Journal of Social Psychology*, 38, 1202-1217.
- Abele, A.E., & Wojciszke, B. (2007). Agency and communion from the perspective of self versus others. *Journal of Personality and Social Psychology*, 93, 751-763.
- Alicke, M.D. (1985). Global self-evaluation as determined by the desirability and controllability of trait adjectives. *Journal of Personality and Social Psychology*, 49, 1621-1630.
- Anderson, N.H. (1968). Likeableness ratings of 555 personality-trait words. *Journal of Personality and Social Psychology*, 7, 272-279.
- Appel, M., Gnambs, T., & Maio, G.R. (2012). A short measure of the need for affect. *Journal of Personality Assessment*, 94, 418-426.
- Bizer, G.Y., Tormala, Z.L., Rucker, D.D., & Petty, R.E. (2006). Memory-based versus on-line processing: Implications for attitude strength. *Journal of Experimental Social Psychology*, 42, 646-653.
- Cacioppo, J.T., & Petty, R.E. (1982). The need for cognition. *Journal of Personality and Social Psychology*, 42, 116-131.
- Cacioppo, J.T., Petty, R.E., Feinstein, J.A., & Jarvis, W.B.G. (1996). Dispositional differences in cognitive motivation: The life and times of individuals varying in need for cognition. *Psychological bulletin*, 119, 197-253.
- Cacioppo, J.T., Petty, R.E., & Geen, T.R. (1989). From the tripartite to the homeostasis model of attitudes. In A. Pratkanis, S. Breckler, & A. Greenwald (Eds.), *Attitude structure and function* (pp 275-305). Hillsdale, NJ: Erlbaum.

- Cacioppo, J.T., Petty, R.E., & Kao, C. (1984). The efficient assessment of need for cognition. *Journal of Personality Assessment*, 48, 306-307.
- Carnevale, J.J., Inbar, Y., & Lerner, J.S. (2011). Individual differences in need for cognition and decision-making competence among leaders. *Personality and Individual Differences*, 51(3), 274-278.
- Chemers, M.M. (1997). *An integrative theory of leadership*. Mahwah, NJ: Erlbaum.
- Crites, S.L., Fabrigar, L.R., & Petty, R.E. (1994). Measuring the affective and cognitive properties of attitudes: Conceptual and methodological issues. *Personality and Social Psychology Bulletin*, 20, 619-634.
- Cuddy, A.J.C., Fiske, S.T., & Glick, P. (2008). Warmth and competence as universal dimensions of social perception: The Stereotype Content Model and the BIAS Map. In M.P. Zanna (Ed.), *Advances in experimental social psychology* (Vol. 40, pp.61–149). New York, NY: Academic Press.
- Cuddy, A.J.C., Fiske, S.T., Kwan, V.S.Y., Glick, P., Demoulin, S., Leyens, J.P...., et al. (2009). Stereotype Content Model across cultures: Universal similarities and some differences. *British Journal of Social Psychology*, 48, 1–33.
- Cuddy, A.J., Glick, P., & Beninger, A. (2011). The dynamics of warmth and competence judgments, and their outcomes in organizations. *Research in Organizational Behavior*, 31, 73-98.
- Eagly, A.H., & Chaiken, S. (1993). *The psychology of attitudes*. Fort Worth, TX: Harcourt Brace.
- Edwards, K. (1990). The interplay of affect and cognition in attitude formation and change. *Journal of Personality and Social Psychology*, 59, 202-216.
- Esses, V.M., & Maio, G.R. (2002). Expanding the assessment of attitude components and structure: The benefits of open-ended measures. *European Review of Social Psychology*, 12, 71-101.

- Fabrigar, L.R., & Petty, R.E. (1999). The role of the affective and cognitive bases of attitudes in susceptibility to affectively and cognitively based persuasion. *Personality and Social Psychology Bulletin*, 25, 363-381.
- Fiske, S.T., Cuddy, A.J.C., & Glick, P. (2002). Emotions up and down: Intergroup emotions result from perceived status and competition. In D.M. Mackie & E.R. Smith (Eds.), *From prejudice to intergroup emotions: Differentiated reactions to social groups* (pp. 247–264). Philadelphia, PA: Psychology Press.
- Fiske, S.T., Cuddy, A.J., & Glick, P. (2007). Universal dimensions of social cognition: Warmth and competence. *Trends in Cognitive Sciences*, 11, 77-83.
- Fiske, S.T., Glick, P., & Xu, J. (2002). A model of (often mixed) stereotype content: Competence and warmth respectively follow from status and competition. *Journal of Personality and Social Psychology*, 82, 878–902.
- Haddock, G., Maio, G.R., Arnold, K., & Huskinson, T.L.H. (2008). Should persuasion be affective or cognitive? The moderating effects of need for affect and need for cognition. *Personality and Social Psychology Bulletin*, 34, 769-778.
- Haddock, G., & Zanna, M.P. (1999). Cognition, affect, and the prediction of social attitudes. *European Review of Social Psychology*, 10, 75-99.
- Haugtvedt, C.P., Petty, R.E., & Cacioppo, J.T. (1992). Need for cognition and advertising: Understanding the role of personality variables in consumer behavior. *Journal of Consumer Psychology*, 1, 239-260.
- Hayes, A.F. (2013). *Introduction to mediation, moderation, and conditional process analysis*. New York: Guilford Press.
- Hill, C.A. (1991). Seeking emotional support: The influence of affiliative need and partner warmth. *Journal of Personality and Social Psychology*, 60, 112-121.

- Huskinson, T.L.H., & Haddock, G. (2004). Individual differences in attitude structure: Variance in the chronic reliance on affective and cognitive information. *Journal of Experimental Social Psychology, 40*, 82-90.
- Judd, C.M., James-Hawkins, L., Yzerbyt, V., & Kashima, Y. (2005). Fundamental dimensions of social judgment: Understanding the relations between judgments of competence and warmth. *Journal of Personality and Social Psychology, 89*, 899-913.
- Kervyn, N., Yzerbyt, V., & Judd, C.M. (2010). Compensation between warmth and competence: Antecedents and consequences of a negative relation between the two fundamental dimensions of social perception. *European Review of Social Psychology, 21*, 155-187.
- Maio, G.R., & Esses, V.M. (2001). The need for affect: Individual differences in the motivation to approach or avoid emotions. *Journal of Personality, 69*, 583-614.
- Maio, G.R., & Haddock, G. (2015). *The psychology of attitudes and attitude change* (2nd edition). London: Sage.
- Maio, G.R., & Olson, J.M. (2000). Emergent themes and potential approaches to attitude function: The function-structure model of attitudes. In G.R. Maio & J.M. Olson (Eds.), *Why we evaluate: Function of attitudes* (pp 417-442). Mahwah, NJ: Erlbaum.
- Peeters, G. (2002). From good and bad to can and must: Subjective necessity of acts associated with positively and negatively valued stimuli. *European Journal of Social Psychology, 32*, 125-136.
- Rosenberg, M.J., & Hovland, C.I. (1960). Cognitive, affective, and behavioral components of attitudes. In C.I. Hovland & M.J. Rosenberg (Eds.), *Attitude organization and change: An analysis of consistency among attitude components*, (pp. 1-14). New Haven, CT: Yale University Press.

- See, Y.H.M., Petty, R.E., & Fabrigar, L.R. (2008). Affective and cognitive meta-bases of attitudes: Unique effects on information interest and persuasion. *Journal of Personality and Social Psychology*, 94, 938-955.
- See, Y.H.M., Petty, R.E., & Fabrigar, L.R. (2013). Affective–cognitive meta-bases versus structural bases of attitudes predict processing interest versus efficiency. *Personality and Social Psychology Bulletin*, 39, 1111-1123.
- Tausch, N., Kenworthy, J.B., & Hewstone, M. (2007). The confirmability and disconfirmability of trait concepts revisited: Does content matter? *Journal of Personality and Social Psychology*, 92, 542-556.
- Trapnell, P.D., & Wiggins, J. S. (1990). Extension of the Interpersonal Adjective Scales to include the Big Five dimensions of personality. *Journal of Personality and Social Psychology*, 59, 781-790.
- Wojciszke, B. (1994). Multiple meanings of behavior: Construing actions in terms of competence or morality. *Journal of Personality and Social Psychology*, 67, 222–232.
- Wojciszke, B. (1997). Parallels between competence- versus morality-related traits and individualistic versus collectivistic values. *European Journal of Social Psychology*, 27, 245-256.
- Wojciszke, B. (2005). Morality and competence in person-and self-perception. *European Review of Social Psychology*, 16, 155-188.
- Wojciszke, B., & Abele, A.E. (2008). The primacy of communion over agency and its reversals in evaluations. *European Journal of Social Psychology*, 38, 1139-1147.
- Wojciszke, B., Bazinska, R., & Jaworski, M. (1998). On the dominance of moral categories in impression formation. *Personality and Social Psychology Bulletin*, 24, 1251-1263.
- Wojciszke, B., & Klusek, B. (1996). Moral and competence-related traits in political perception. *Polish Psychological Bulletin*, 27, 319-324.

Zanna, M.P., & Rempel, J.K. (1988). Attitudes: A new look at an old concept. In D. Bar-Tal & A.W. Kruglanski (Eds.), *The social psychology of knowledge* (pp.315-334). Cambridge, England: Cambridge University Press.

Table 1. *Study 1: Correlations among NFA, NFC, and attribute evaluations*

| <i>Variables</i> | Warm traits | Cold traits | Competent traits | Incompetent traits |
|------------------|----------------|----------------|---------------------|-----------------------|
| NFA | .42** | -.30* | -.20 | .30* |
| NFC | .11 | .10 | .63** | -.46** |

Note: * $p < .05$, ** $p < .001$

Table 2. *Study 1: Correlations among NFA, NFC, and difference in ranking measures of attributes*

| Variables | Difference median warm-cold | Difference median competent- incompetent |
|--|--------------------------------|--|
| NFA | .57** | -.33** |
| NFC | -.47** | .42** |
| Difference median warm-cold | - | -.68** |
| Difference median competent-incompetent | -.68** | - |

Note: ** $p < .001$

Table 3. *Study 2: Correlations among NFA, NFC, structural bases, and meta-bases*

| Variables | NFA | NFC | Structural bases | Meta-bases |
|------------------|-----|-----|------------------|------------|
| NFA | — | .16 | .01 | .05 |
| NFC | | — | .01 | -.17* |
| Structural bases | | | — | .12 |
| Meta-bases | | | | — |

Note: * $p = .06$

Table 4. *Study 2: Correlations among NFA, NFC, structural bases, meta-bases, and attitude outcomes*

| <i>Warmth-related outcomes</i> | | | | |
|------------------------------------|-----------|-------------|---|--|
| Variables | Warm | Cold | Prefer warm versus cold | Mean difference warm-cold |
| NFA | .28** | -.23* | .21* | .31** |
| NFC | -.04 | .00 | -.05 | -.03 |
| Structural bases | .00 | .08 | .11 | -.04 |
| Meta-bases | -.03 | -.09 | -.07 | .04 |
| <i>Competence-related outcomes</i> | | | | |
| Variables | Competent | Incompetent | Prefer competent versus incompetent | Mean difference competent- incompetent |
| NFA | .00 | -.06 | -.05 | .04 |
| NFC | .19* | -.20* | .18 | .26** |
| Structural bases | -.16 | -.04 | -.08 | -.09 |
| Meta-bases | .05 | -.06 | .00 | .07 |

Note: * $p < .05$; ** $p < .01$

Table 5. *Study 2: Non-parametric correlations among NFA, NFC, structural bases, meta-bases, and the ranking measure*

| Variables | Carol (warm) ranking | Lisa (cold) ranking | Amber (competent) ranking | Samantha (incompetent) ranking |
|------------------|-------------------------|------------------------|---------------------------------|--------------------------------------|
| NFA | .26** | -.09 | -.02 | -.06 |
| NFC | -.11 | .17 | .26** | -.29** |
| Structural bases | .10 | -.17 | .08 | -.02 |
| Meta-bases | -.06 | .00 | -.01 | .02 |

Note: ** $p < .01$

Table 6. *Study 3: Correlations among NFA, NFC, structural bases, meta-bases and difference in valence ratings*

| <i>Variables</i> | Warm traits | Cold traits | Competent traits | Incompetent traits |
|------------------|----------------|----------------|---------------------|-----------------------|
| NFA | .29** | -.20* | .15* | -.13 |
| NFC | .01 | -.04 | .28** | -.26** |
| Structural bases | .02 | -.04 | .09 | .11 |
| Meta-bases | .06 | -.12 | -.08 | .00 |

Note: * $p < .05$; ** $p < .01$

Table 7. *Study 3: Correlations among NFA, NFC, structural bases, meta-bases, and attitude outcomes*

| <i>Warmth-related outcomes</i> | | | |
|------------------------------------|-----------|-------------|---------------------------------------|
| Variables | Warm | Cold | Mean difference warm-cold |
| NFA | .15* | -.20** | .22** |
| NFC | .08 | .13 | -.06 |
| Structural bases | .01 | -.02 | .02 |
| Meta-bases | .02 | -.07 | .06 |
| <i>Competence-related outcomes</i> | | | |
| Variables | Competent | Incompetent | Mean difference competent-incompetent |
| NFA | .08 | .05 | .02 |
| NFC | .35** | -.09 | .28** |
| Structural bases | -.01 | .04 | -.04 |
| Meta-bases | -.07 | .03 | -.06 |

Note: * $p < .05$; ** $p < .01$

Appendix

Carol is often regarded as a kind and sympathetic person. She tends to be warm with others.

According to her friends, her best characteristic is honesty. Moreover, she likes friendship and she usually goes out with her peers.

Lisa is often regarded as a sullen and unsympathetic person. She sometimes tends to be cold with others. According to her friends, her most important characteristic is to focus on her own interests. She would rather stay home alone than go out with her peers.

Amber is often regarded as an organized and industrious person. She tends to be self-disciplined. According to her friends, her best characteristic is her intelligence. Moreover, she is reflective and inquisitive all the time.

Samantha is often regarded as a disorganized and inefficient person. She tends to be undisciplined. According to her friends, her best characteristic is her impulsiveness. She doesn't like to find out new solutions, but prefers conventional answers.

Footnotes

¹ The predictor variables were measured at the end of the study. The order of presentation of these constructs was not manipulated across participants.

² We chose to maintain a consistent order in order to be consistent with the prior research using this approach and because a consistent order would minimize the introduction of variance due to order variations, helping to maximize the reliability of scores across participants.

³ The differing degrees of freedom are due to one participant ranking just one target.

⁴ Given the cross-sectional nature of the study, we tested an alternative model in which we considered the difference in attitude toward Carol and Lisa as the mediator and the difference in the valence ratings of warm and cold traits as the outcome. Not surprisingly, the indirect effect was significant in this model. Nevertheless, this indirect effect was weaker ($IE=.18$, 95% $CI=.08,.28$) than the one we hypothesized and described in the text. A similar pattern emerged when we tested the alternative model in which we considered the difference in attitude toward Amber and Samantha as the mediator and the difference in the valence ratings of competent and incompetent traits as the outcome ($IE=.21$, 95% $CI=.10,.35$). Taken together, these results demonstrate that our models provide the best fit to the data.